

Subgoal 2

Can we drink the water?*

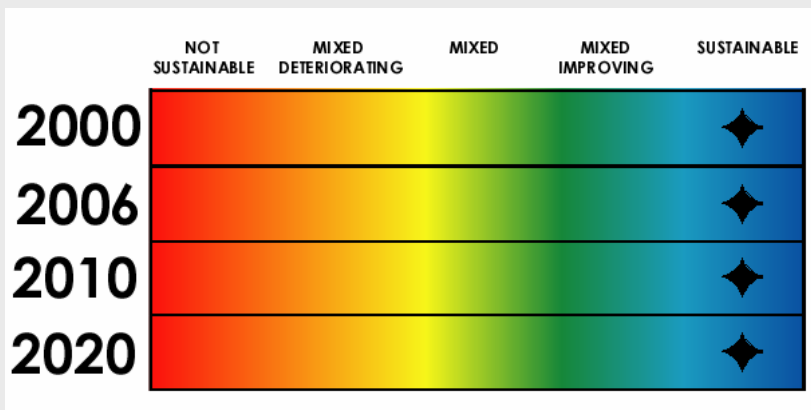
Status

The drinking water in the Lake Michigan basin is of good quality, although there have been sporadic outbreaks of illness related to drinking water.

Indicators (State of the Lakes Ecosystem Indicators by Number)

- 117 - Atmospheric Deposition of Toxic Chemicals
- 118 - Toxic Chemical Concentrations in Offshore Waters
- 3516 - Household Stormwater Recycling
- 4175 - Drinking Water Quality in Finished Product
- 6063 - Municipal Wastewater Treatment
- 7128 - Sustainable Agricultural Practices

Lake Michigan Target Dates for Sustainability



Challenges

- To understand possible vulnerabilities in water sources and prepare protection plans
- To monitor for possible new contaminants
- To understand the implications of and monitor groundwater depletion in the basin as it relates to Lake Michigan
- To educate the public on the hydrological cycle and the need for stewardship of both drinking water quantity and quality
- Need for Operations and Maintenance Plans for infrastructure
- Research need on health effects of contaminants and safe levels established

Next Steps

- Continue Watershed Academy
- Seek funding to develop a source water protection GIS system.
- Enhance local public water supply security
- Identify resources for public water suppliers to ensure that by 2011, 80% of the community water systems will be substantially implementing source water protection plans

* The original 1998 Lake Michigan Lakewide Management Plan goal referred to water quality. Recent concerns about quantity are discussed in Chapter 6. Both quantity and quality factor into "sustainability."

Drinking Water Contaminants

The waters of Lake Michigan and surrounding areas are a primary source of drinking water for 10 million people who live in the basin. The Lake Michigan states currently are delegated to run their own drinking water programs. Since LaMP 2000 the issue of ground water depletion has been growing in importance with implications for drinking water sources and habitat (see Chapter 6 for more information on ground water).

Various contaminants can adversely impact drinking water, including microorganisms (e.g., bacteria, viruses, and protozoa such as cryptosporidium), chemical contaminants (including naturally occurring compounds and anthropogenic or synthetic chemicals), and radiological contaminants (including naturally occurring inorganic and radioactive materials and metals). Some contaminants in raw (untreated) water supplies, such as aluminum, arsenic, copper, and lead, can be both naturally occurring and the result of human activities. Other contaminants, such as household chemicals, industrial products, urban storm water runoff, fertilizers, human and animal waste, nitrate (from fertilizers and sewage), and pesticides, may also end up in raw water supplies (EPA, 1999a; Health Canada, 1998).

Certain contaminants pose a concern when present in drinking water because of possible health consequences associated with these substances. These contaminants may be in raw water as a result of industrial and agricultural activities or treated wastewater discharges (Minnesota Pollution Control Agency, 1997). Some may also be present in treated water as a result of chemicals used in the drinking water treatment process (Health Canada, 1998). The impact of contaminants is diluted in a large water body like Lake Michigan but could be more serious in a groundwater source.

In general, drinking water provided by public water suppliers is likely to remain of good quality because of the multiple pollutant barrier approach being implemented across the basin. Not only are treatment systems and operating practices continually improving, increased monitoring is also providing more information about source water supplies and the need for source water protection. In the past two years, greater emphasis has been



Great Lakes Regional Collaboration Action Items

Coastal Health

The **near shore waters and the coastal areas** are the region's largest source of drinking water and experience a variety of recreational activities. To minimize the risk to human health resulting from contact with near shore waters, actions needed include:

- major improvements in wet weather discharge controls from combined and sanitary sewers;
- identify and control releases from indirect sources of contamination;
- implement a "risk-based approach" to manage recreational water;
- protect sources of drinking water; and
- improve the drinking water infrastructure and support source water protection.

placed on protecting raw sources of drinking water. Both the source water assessments that were completed for public water supplies and recent data collected from 22 sites around the Great Lakes are providing more information about raw water supplies.

Drinking Water Monitoring and Reporting

Continuing efforts must be made to inform health professionals and the public of the results of analyses of drinking water. USEPA requires that public water supplies be monitored for bacteriological, inorganic, organic, and radiological contaminants. The analyses of drinking water include tests for the physical and chemical characteristics of the water as well as for contaminants from natural sources or human activities. In addition, the USEPA Office of Groundwater and Drinking Water (OGWDW) web site at www.epa.gov/OGWDW/ provides detailed information on the nation's drinking water, including

Source Water Assessment and Protection Program Status

The Safe Drinking Water Act Amendments of 1996 established the Source Water Assessment and Protection Program (SWAP) to help States locate and identify existing and potential threats to the quality of public drinking water for the purpose of fostering local efforts to benefit and protect the resource. States are responsible for assessing the condition of source water for all public water systems within their borders. Each assessment must include a delineation of the source water area for each public water system, an inventory of potential contaminant sources, a determination of the system's susceptibility to contamination from those sources, and must be made available to the public. Assessments are intended to be a useful tool in helping water system develop plans and implement measures to protect their water source.

Wisconsin, Illinois, and Michigan have completed all assessments. Indiana expects to complete all assessments by 2006. The focus of this program has now shifted to using the assessments to encourage States and local water utilities to develop source water protection plans and implement protection measures. USEPA and the States will be working to establish partnerships with volunteer and nonprofit organizations, and integrate source water protection with other regulatory programs in order to achieve results.

More information on this program is available at the following internet address www.epa.gov/OGWDW/protect/protect.html.



The Lake Michigan Toolbox Water Security Resources

Water Security Resources

These resources are available at: <http://cfpub.epa.gov/safewater/watersecurity/waterresources.cfm>

- Information on training courses, meetings, and workshops / webcasts for utilities, federal and state governments, and utility security officials.
- Tools and technical assistance to assist utilities in developing and updating vulnerability assessments and emergency response plans.
- Information about recently awarded grants and potential financial assistance programs.
- Information from trade/industry organizations, clearinghouses and information centers, state homeland security web sites, state drinking water protection web sites, and USEPA programs.

Drinking Water Security Education Materials

The USEPA has recently developed a collection of useful education and resource materials on drinking water security. The information includes resources on emergency preparedness, drinking water security, and law enforcement. These materials can be found at: www.epa.gov/safewater/watersecurity/index.cfm.

A compendium of laboratories identifying their capabilities to analyze for contaminants of concern can be found at: <http://www.epa.gov/compendium> and the Water Contaminant Information Tool (WCIT) to assist in identifying unknown contaminants in water can be found at: www.epa.gov/wcit. User registration for these sites is required.

drinking water and health information, drinking water standards, and local drinking water information. Community water suppliers deliver high-quality drinking water to millions of people every day, and a network of government agencies is in place to ensure the safety of public drinking water supplies.

Water Infrastructure Security

Under both the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA), USEPA works closely with partner organizations -- other government agencies, and water utilities and associations (both drinking water and wastewater) to ensure clean and safe water. Industry and government are also working cooperatively to improve drinking water and wastewater security. Building on and supporting long-established relationships with our partners, USEPA helps the water sector to: (1) understand and utilize the best scientific information and technologies for water security; (2) support assessment of utilities' vulnerabilities to possible attack; (3) take action to improve security; and (4) respond effectively and efficiently in the event that an incident occurs. This commitment is outlined in USEPA's Strategic Plan for Homeland Security.

A number of actions are underway to support development of tools, training and technical assistance for small and medium drinking water, and

wastewater utilities and promote information sharing, and research on water security (See the Lake Michigan Toolbox on preceding page).

The Public Health Security and Bioterrorism Preparedness and Response Act of 2002 has drinking water utilities facing new responsibilities. While their mission has always been to deliver a dependable and safe supply of water to their customers, the challenges inherent in achieving that mission have expanded to include security and counter-terrorism. In the Public Health Security and Bioterrorism Preparedness and Response Act of 2002, Congress recognizes the need for drinking water systems to undertake a more comprehensive view of water safety and security.

Drinking Water Security in the Lake Michigan Basin

All Community Water Systems in the Lake Michigan Basin have submitted their Vulnerability Assessments as required by the "Public Health Security and Bioterrorism Preparedness and Response Act of 2002". The current focus of drinking water security efforts is to integrate drinking water security into the everyday culture at all levels – local, state and federal. The National Drinking Water Advisory Council (NDWAC) convened a Water Security Work Group (WSWG) that was tasked with identifying the key features of an "active and effective" security program. The NDWAC-WSWG was composed of representatives from water systems, water professional organizations, state drinking water officials and USEPA. The WSWG identified 14 "key" features of an active and effective security program for water systems. USEPA subsequently met with the Association of State Drinking Water Administrators (ASDWA) Water Security Committee and it was agreed that the 14 "key" features should be integrated into the state and federal drinking programs. USEPA will continue to work with its partners to identify and facilitate integration of water security activities at all levels and is working to identify ways of measuring success in these areas. (see the Water Resources Toolbox on the previous page).



The Lake Michigan Toolbox Drinking Water Education

Drinking Water Academy

Established by the USEPA Office of Ground Water and Drinking Water, the Drinking Water Academy (DWA) is a long-term training initiative whose primary goal is to expand USEPA, State, and Tribal capabilities to implement the 1996 Amendments to the Safe Drinking Water Act (SDWA).

In addition to providing classroom and Web-based training, the DWA acts as a resource for training materials pertaining to SDWA implementation. More information is available at:

www.epa.gov/safewater/dwa.html.

Inadvertent Water Contamination

Contamination of drinking water sources can result inadvertently during the production, use, and

Pharmaceuticals, Hormones, and Other Organic Wastewater Contaminants in U.S. Streams, 1999-2000:

A National Reconnaissance

To provide the first nationwide reconnaissance of the occurrence of pharmaceuticals, hormones, and other organic wastewater contaminants (OWCs) in water resources, the U.S. Geological Survey used five newly developed analytical methods to measure concentrations of 95 OWCs in water samples from a network of 139 streams across 30 states during 1999 and 2000. The selection of sampling sites was biased toward streams susceptible to contamination (i.e. downstream of intense urbanization and livestock production). OWCs were prevalent during this study, being found in 80% of the streams sampled. The compounds detected represent a wide range of residential, industrial, and agricultural origins and uses with 82 of the 95 OWCs being found during this study. The most frequently detected compounds were coprostanol (fecal steroid), cholesterol (plant and animal steroid), *N,N*-diethyltoluamide (insect repellent), caffeine (stimulant), triclosan (antimicrobial disinfectant), tri(2-chloroethyl)phosphate (fire retardant), and 4-nonylphenol (nonionic detergent metabolite). Measured concentrations for this study were generally low and rarely exceeded drinking-water guidelines, drinking-water health advisories, or aquatic-life criteria. Many compounds, however, do not have such guidelines established. The detection of multiple OWCs was common for this study, with a median of seven and as many as 38 OWCs being found in a given water sample. Little is known about the potential interactive effects (such as synergistic or antagonistic toxicity) that may occur from complex mixtures of OWCs in the environment. In addition, results of this study demonstrate the importance of obtaining data on metabolites to fully understand not only the fate and transport of OWCs in the hydrologic system but also their ultimate overall effect on human health and the environment.

A follow-up study by USGS released in 2006 again showed the presence of pesticides in waters, but below regulatory levels. More information is available at: <http://ca.water.usgs.gov/pnsp/pubs/circ1291>.

disposal of the numerous chemicals used in industry, agriculture, medical treatment, and in the household. Knowledge of the environmental occurrence or toxicological behavior of contaminants has resulted in increased concern for potential adverse environmental and human health effects. For many contaminants, public health experts have incomplete understandings of their toxicological significance (particularly effects of long-term exposures at low-levels). The need to understand the processes controlling contaminant transport and fate in the environment, and the lack of knowledge of the significance of long-term exposures has increased the need to study environmental occurrence down to trace levels. Furthermore, the possibility that environmental contaminants may interact synergistically or antagonistically has increased the need to define the complex mixtures of chemicals that are found in our waters (<http://toxics.usgs.gov/regional/emc.html>)

Water Quality Tracking

In 2002, USEPA released the Great Lakes Strategy. A key action from this effort was stated: "Beginning in 2002, USEPA, in cooperation with local utilities, will track water quality at the intake points of selected drinking water treatment plants around the Lakes. Findings will be reported to the public through the biennial State of the Lakes Ecosystem Conference (SOLEC) State of the Lakes report." More information is available at: www.epa.gov/glnpo/gls/gls04.html.

As of April 2003, USEPA examined data provided by 114 public water systems in the Great Lakes basin and by the U.S. Safe Drinking Water Information System. Specifically, USEPA has evaluated various contaminants, including the following:

- Atrazine, an agricultural pesticide
- Nitrate and nitrite, which are naturally occurring nutrients found at high levels in fertilizers
- Total coliform bacteria, *E. coli*, protozoa, giardia, and cryptosporidium may contaminate water supplies after sewage spills

USEPA has also examined the turbidity, taste, odor, and organic carbon content of drinking water supplies to assess any other potential health issues. Of the public water systems evaluated between 1999 and 2001, none exceeded drinking water standards

for atrazine, and only one exceeded drinking water standards for nitrate and nitrite after treatment. However, atrazine, nitrate, and nitrite are detected at elevated levels in the Great Lakes, which indicates that advanced treatment technologies prevent the entry of significant concentrations of these contaminants from entering drinking water systems. For total coliform and *E. coli*, only one violation of drinking water standards occurred between 1999 and 2001 in the Great Lakes basin. Finally, public water systems rarely have problems with turbidity, taste, odor, or organic carbon content.

Drinking Water State Revolving Fund

The Nation's water systems must make significant investments to install, upgrade, or replace infrastructure to continue to ensure the provision of safe drinking water to their 240 million customers. Installation of new treatment facilities can improve the quality of drinking water and better protect public health. Improvements are also needed to help those water systems experiencing a threat of contamination due to aging infrastructure systems.

The Safe Drinking Water Act, as amended in 1996, established the Drinking Water State Revolving Fund (DWSRF) to make funds available to drinking water systems to finance infrastructure improvements. The program also emphasizes providing funds to small and disadvantaged communities and to programs that encourage pollution prevention as a tool for ensuring safe drinking water. The funds are passed from USEPA to each state. For more information see www.epa.gov/safewater/dwsrf.html.

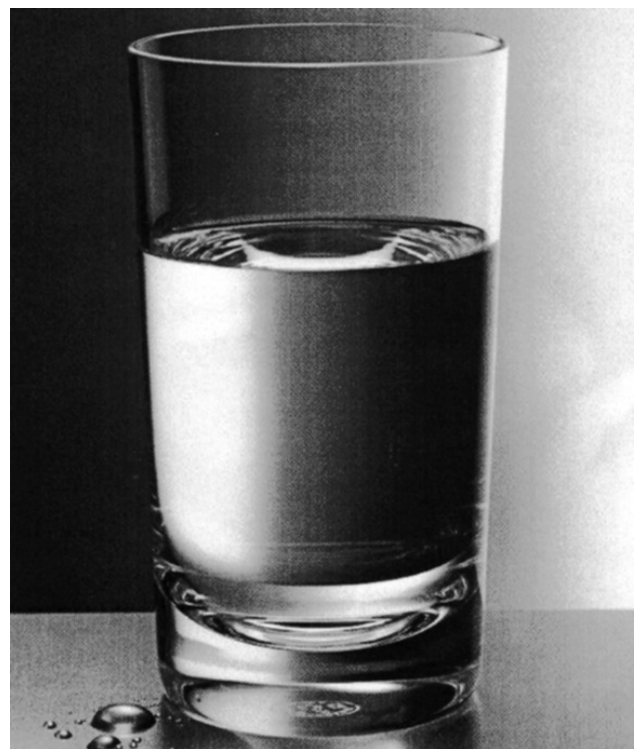
Drinking Water Quality Reports

Information on local water quality is available from several sources, including state public health departments and local water suppliers. To inform the public of the results of analyses of drinking water and to demonstrate a commitment to protecting human health, each community public water supplier is required to generate an annual Consumer Confidence Report that is made available to all residents receiving water from the water system. A Consumer Confidence Report provides information about the source of water used, its susceptibility to contaminants, the levels of contaminants detected in the water, the likely sources of contaminants, and

potential health effects of any contaminant detected at a concentration above its maximum contaminant level (MCL). Consumer Confidence Reports can be reviewed to get an indication of the overall quality of treated surface water and groundwater and the condition of the drinking water provided. In addition, starting in 2003, the states will distribute information on the status of the source waters used by public water suppliers and the level of susceptibility of those source waters to contamination.

Next Steps

- Continue Watershed Academy
- Seek funding to develop a source water protection GIS system.
- Enhance local public water supply security
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The Lake Michigan Toolbox

USEPA Pollution Prevention Fact Sheets

USEPA has published a series of fact sheets on best management practices (BMP) measures for activities that are likely to impact the sources of water used as drinking water. These fact sheets are also used in conjunction with a source water protection training course (More information is available at: <http://www.epa.gov/safewater/dwa/electronic.html>). This training course is available to interested states, USEPA Regions, and organizations through the USEPA Drinking Water Academy See box on opposite page). If you are interested in sponsoring a training course, please contact James Bourne at 202-260-5557 or Steve Ainsworth at 202-260-7769. Each bulletin discusses how particular activities can be managed in such a way as to prevent contamination of drinking water. Bulletins available include:

- **Highway Deicing** www.epa.gov/safewater/protect/pdfs/highwaydeicing.pdf
- **Airport Deicing** www.epa.gov/safewater/protect/pdfs/airportfs.pdf
- **Storm Water Runoff** www.epa.gov/safewater/protect/pdfs/stormwater.pdf
- **Pet and Wildlife Waste** www.epa.gov/safewater/protect/pdfs/petwaste.pdf
- **Septic Systems** www.epa.gov/safewater/protect/pdfs/septic.pdf
- **Agricultural Fertilizer** www.epa.gov/safewater/protect/pdfs/fertilizer.pdf
- **Above Ground Storage Tanks** www.epa.gov/safewater/protect/pdfs/ast.pdf
- **Turfgrass Application** www.epa.gov/safewater/protect/pdfs/turfgrass.pdf
- **Underground Storage Tanks** www.epa.gov/safewater/protect/pdfs/ust.pdf
- **Large Scale Application of Pesticides** www.epa.gov/safewater/protect/pdfs/lspesticides.pdf
- **Vehicle Washing** www.epa.gov/safewater/protect/pdfs/vehicle.pdf
- **Small-scale Application of Pesticides** www.epa.gov/safewater/protect/pdfs/sspesticides.pdf
- **Livestock, Poultry, and Horse Waste** www.epa.gov/safewater/protect/pdfs/livestock.pdf
- **Sanitary Sewer Overflows and Combined Sewer Overflows** www.epa.gov/safewater/protect/pdfs/ssocso.pdf
- **Managing Small Quantity Chemical Use to Prevent Contamination of Drinking Water** www.epa.gov/safewater/protect/pdfs/chemical_use_fact_sheet.pdf

More information is available at: www.epa.gov/safewater/protect/swpbull.html.



Source USEPA



Source USEPA



Source USEPA

Great Lakes Regional Collaboration Goals and Recommendations Relevant to the Lake Michigan LaMP Subgoal 2



Coastal Health Drinking Water Related Goals and Recommendations

Goal: The quality of Great Lakes basin drinking water from coastal and tributary sources will be protected from chronic and episodic threats of chemical and biological contamination that pose unacceptable risk following conventional water treatment.

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Interim Milestones:

- By 2007, amendments to the Safe Drinking Water Act (SDWA) will be adopted to enhance flexibility in how State Revolving Funds may be used for infrastructure system improvements and the Clean Water SRF will be fully funded;
- By 2007, Bioterrorism Act amendments will be adopted to require implementation of security measures that address potential resource/facility vulnerabilities;
- By 2010, states will have strategies for protecting water quality for the intended use of public water supply; and
- By 2010, all states and local municipal water supply systems will complete plans for

infrastructure upgrades that address aging system deficiencies and integrate security measures for vulnerable resources/facilities.

Recommendations

- Eliminate to the extent provided by existing regulation inputs of untreated or inadequately treated human and industrial waste to Great Lakes basin waters through implementation of wet weather programs, including improvements to wastewater treatment systems.
- Identify indirect pollution sources capable of adversely impacting Great Lakes coastal health and, upon identification, promulgate and enforce regulations, provide public education, promote research, and initiate remediation to reduce the impact of these sources.
- Standardize, test, and implement a risk-based approach to manage recreational water.
- Protect drinking source water quality.
- Use the Drinking Water State Revolving Fund to improve drinking water infrastructure and support source water protection.